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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,383	01/05/2001	Bruce M. Schena	IMM029B	6408

7590 11/03/2005

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ART UNIT	**PAPER NUMBER**
2673	

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/755,383
Filing Date: January 05, 2001
Appellant(s): SCHENA ET AL.

Khaled Shami
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5/9/2005 appealing from the Office action mailed 5/5/2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5642469	HANNAFORD	6-1997
3919691	NOLL	11-1975

6111577 ŻILLES 8-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. **Claims 47-50, 52, 54, 56-60, 71-73, 75, and 77-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannaford et al. (5642469) in view of Noll (3919691).**

As in claims 47 and 71, Hannaford et al. teaches of a touchpad sensor configured to detect a position and motion of an object in an x-y plane, **column 4 lines 1-5 and 49-55**,

said touchpad sensor further configured to detect a degree of force applied to said touchpad sensor in a z-direction, **column 4 lines 1-5 and 20-24**,

and to output at least one sensor signal, the sensor signal being based on the position of the object, the motion of the object and the detected degree of force, **column 1 lines 52- 67, column 2 lines 5-12. and 20-23**, wherein a feedback signal is output having a texture and/or force resistance corresponding to the location of the object 14 in 3D space.

and at least one actuator, coupled to and spaced apart from said touchpad sensor **column 1 lines 25-31**, **column 4 lines 49-55**,

said actuator configured to receive a feedback signal from the computer and generate haptic feedback based on the feedback signal, the feedback signal being associated with the sensor signal, **column 1 lines 32-34, 53-67, column 2 lines 20-23, column 3 lines 5-10**,

and a linkage coupling the object and the touchpad sensor, **column 1 lines 25-31, figure 2-5, column 4 lines 42-67,** wherein said linkage can be any of said actuators, joints, and links, known in the art.

Wherein the object is equivalent to the pen like tool 14, which connects to the device at touchpad point 12, which measures three degrees of freedom from the object being manipulated by a user.

As shown in figures 4 and 5, the at least one actuator 32, is coupled to and spaced apart from the touchpad sensor point 12, given the teaching of redundant actuators but not redundant encoders exist. Whereby a redundant actuator without an encoder is spaced apart from a first actuator including sensing elements.

The pen like tool 14 controls the touchpad point 12 which is coupled to actuators that are connected to encoders and sensors for the purpose of producing electric signals related to the position and displacement of the control point, given encoders and sensors are known to produce signals. Therefore **while Hannaford et al. does not explicitly express or use language reciting "output signals" they would have been obvious** to the skilled artisan given said sensor and encoders are connected with said actuator and given the device produces feedback and cursor displacement shown on a computer display terminal, as known in the art.

Noll teaches of the a tactile feedback force display system as taught by Hannaford et al., **wherein the missing system and signal level schematic of Hannaford showing "output signals" is shown by Noll's figure 1, as proof of said feature being obvious for the kind of device taught by Hannaford.** The features of Noll are combinable with Hannaford's given Noll also teaches that for such a tactile feedback display system any arrangement for permitting controlled motion in the three directions may be used, column 3 lines 45-50. Hannaford and Noll teaches of devices solving the same problem, that of providing a feedback device having three degrees of freedom in the xyz directions. Noll further teaches of the combination of potentiometers, accelerators, and strain gages for the purpose of measuring force applied to the system, column 5 lines 9-29. Such a combination can be implemented as a

substitute in Hannaford or as an illustration of what Hannaford has omitted in connection with said sensing elements coupled to the actuator.

Therefore it would have been obvious to the skilled artisan at the time of the invention to combine the sensing elements of Noll, also necessary in Hannaford, with the actuator elements of Hannaford producing said "output signals" because Noll teaches that tactile feedback force display systems can use any arrangement for permitting controlled motion in the three directions, and Hannadord teaches of such a tactile feedback force display system, as found in claims 47 and 71. Further feedback denotes a signal returning to a source, that source being the input device that produces feedback based on its displacement in the three degrees of freedom of the xyz directions. With such a device a virtual 3 dimensional surgery simulation can be performed by a doctor receiving friction or tension impulses felt by the doctor's hand while holding the manipulator device 14 as it cuts through the bone of a test object seen on the computer. The cursor could be represented by a surgeons virtual scalpel cutting device moving in three dimensions.

As in claim 60, Hannaford et al. in view of Noll teaches of the limitations as applied to claims 47 and 71 as amended, and a linkage coupling the object and the touchpad sensor, column 1 lines 16-31, figures 2d, wherein said linkage can be any of said actuators, joints, and links, known in the art, the pen like tool 14 is

used to apply forces and links the object to the touchpad which further links to actuators and encoders, which further links to the computer given Hannaford teaches of an object movable in an xy plane, the object being associated with a graphical representation of a cursor, column 1 lines 16-17, 52-67, column 2 lines 7-29, wherein a graphical cursor is broadly interpreted as a computer displayed icon that moves on the display based on the manipulation of an input device, wherein the force display of Hannaford inherently teaches of a computer object being moved according to a manipulated input device, wherein depending on the position of the control point and force applied to a manipulator within a virtual reality computer simulated environment shown the user via the display interface, the operator moves an iconic scalpel to perform surgery and feel the tactile feedback when cutting simulated tissue. The iconic scalpel in this embodiment is the graphical cursor being moved in the xy plane, as found in claim 60. Further, Noll teaches also teaches of seeing the position of a point in space on a display as he moves the control stick under the control of the computer, column 4 lines 18-39, wherein a said point represents a cursor as is known in the art, as found in claim 60.

As in claims 77-80, Hannaford teaches of wherein the linkage includes a pointer member, figure 2 item 14, and wherein the linkage is further coupled to the actuator, figure 1 items 38, 40, 42, 43, 42, 12.

As in claim 48 and 72, Hannaford teaches wherein the magnitude of haptic feedback is proportional to the detected degree of force, column 2 lines 10-25, wherein the operator is able to trace the virtual object shapes and feel the object boundaries, such as tissue having a shape, texture and force resistance variables at different locations. Therefore the operator experiences the sensation of cutting through the virtual tissue in proportion to the texture given to the tissue and the force applied to the control point, obviating the magnitude of haptic feedback being proportional to the detected degree of force, given these simulation objectives. Noll also teaches of wherein the magnitude of feedback force is proportional to the measured force, column 5 lines 20-30.

As in claim 49 and 73, Hannaford teaches wherein the haptic feedback is configured to simulate friction in the xy plane, column 2 lines 10-25, wherein said haptic feedback in the xy force resistance variables at different locations produces plane. Further Noll teaches of said feedback simulating friction in the xy plane, column 4 lines 40-60.

As in claim 50, Hannaford teaches wherein the haptic feedback is based on data values associated with a graphical representation of a pen drawing object on a graphical display, column 1 lines 59-67, column 2 lines 10-30, column 3 lines 1 1-15, wherein said limitation would be an obvious design choice given the known uses of pen-based input device manipulators.

As in claim 52, Hannaford teaches wherein the haptic feedback is a texture sensation, column 2 lines 16-18. Noll, column 6 lines 55-65, column 7 lines 25-35.

As in claim 54 and 75, Hannaford teaches wherein the actuator is configured to generate the haptic feedback if the detected degree of force exceeds a predetermined level, column 2 lines 10-30, wherein the level between zero force and force applied produces a haptic feedback response. Noll, column 7 lines 5-40.

As in claim 56, Hannaford teaches wherein said touchpad sensor is configured to detect a contact location of a pointer member, the pointer member being associated with the object, column 3 lines 5-10.

As in claim 57, Hannaford teaches fudher comprising a linkage mechanism configured to couple the object to said actuator, said linkage mechanism configured to allow motion of the object in said x-y plane, column 3 lines 11-16, column 2 lines 38-48, figures 4 and 5, figure 1 items 38, 40, 42, 43, 42, 12.

As in claim 58, Hannaford teaches wherein said user manipulatable object is one of a mouse and a stylus, column 3 lines 10-16, further wherein it would have

been obvious to the skilled artisan that a mouse is a well known substitute input device for said pen-like tool or stylus.

As in claim 59, Hannaford teaches of wherein said touchpad sensor includes a planar photo diode, column 4 lines 42-67, wherein photo diodes are well known encoder means for input devices with three degrees of freedom.

2. Claims 51, 53, 55, 61-68, 74, and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannaford et al. (5642469) in view of Noll (3919691) and Zilles et al. (6111577).

As in claims 51, 53, 55, 61-68, 74, and 76 Hannaford et al.. teaches of said invention as applied to claims 47, 60, and 71, however Hannaford is silent as to said computer and processor details, said damping, said function of velocity, texture, and indexing. Zilles et al teaches of a tactile force feedback manipulator devices with three degrees of freedom as describe by Hannaford, however Zilles et al in not silent on said computer and processor details and other features, figure 15, column 18 lines 43-55, wherein the computer and processor details of Hannaford are well known as suggested by Zilles. Nor is Noll silent on said silent as to said features, figure 1 and columns 5 and 7.

As in claim 61, Zilles teaches of further comprising a control processor separate from said host computer, said control processor controlling said at least one actuator to output said tactile sensations, and wherein data derived from said degree of force or pressure applied to said touchpad sensor is used by said control processor, at least in pady, to control said tactile sensations, column 18 lines 43-55. Noll, figure 1 item 10.

As in claim 62-67, Zilles teaches of said damping, friction, and texture sensations, column 7 lines 7-17, column 17 lines 1-13, Noll, column 5-7.

As in claims 51, 53, and 74, Zilles teaches of said control as a function of velocity, column 7 lines 5-25. Noll, column 5 lines 5-15.

As in claims 68, Hannaford in view of Zilles teaches of said stylus and mouse for the same reasons of obviousness as applied to claim 58, in view of said three degrees of freedom.

As in claims 55 and 76, said indexing based on force in the z direction is well known in the art of input devices with three degrees of freedom as taught by both Hannaford and Zilles. Noll teaches of force in three degrees of freedom, column 5 lines 15-30, and indexing, column 8 lines 47-60.

(10) Response to Argument

1. **Applicant argues** Hannaford et al. does not disclose a touchpad sensor. **Examiner argues** Hannaford et al. teaches of a touchpad sensor point, figures 1-5 item 12. This point senses three degrees of freedom, x, y, and z, as known in the art.

2. **Applicant argues** there is no suggestion in Hannaford et al. of the use of a touchpad sensor, or of a linkage coupling the touchpad sensor with an object in the manner of the "***present*** invention". **Examiner argues** that both the touchpad and linkage with an object are taught in the manner of the "***claimed*** invention". The touchpad is equivalent to Hannafords control point 12, the object is equivalent to Hannafords pen like tool 14, and the linkage is equivalent to Hannafords actuator/encoder assembly, column 4 lines 40-60.

3. **Applicant argues** claim 60 recites a touchpad sensor and a linkage coupling it to an object, while claim 71 recites detection of motion and position in the xy plane and force in the z direction using a touchpad sensor. **Examiner argues** as mentioned above that both the touchpad and linkage with an object are taught in the manner of the "claimed invention". The touchpad is equivalent to Hannafords control point 12, the object is equivalent to Hannafords pen like tool 14, and the linkage is equivalent to Hannafords actuator/encoder assembly,

column 4 lines 40-60. **Examiner argues** Hannaford teaches of the detection of motion and position in the xy plane and force in the z direction, column 4 lines 1-4 and column 8 lines 50-65.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Examiner David L. Lewis

October 31, 2005

Conferees:

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